CLAIMS

What Is Claimed Is:

1. A point source module comprising:

(a) a Shack cube comprising a beam splitter cube having four optically functional faces, with an optical element having a spherical reference surface secured to one of said four faces and defining a reference arm;

(b) a test arm that is associated with transmission of optical radiation from a source to a sample and through one of the following:

(i) said reference surface, or

(ii) a face of said beam splitter cube adjacent said reference surface and on the opposite side of the beam splitting surface from said reference surface;

(c) a point source of optical radiation whose emissions are incident on a face of said beam splitter cube such that light from said source traverses both said reference arm and said test arm; and

(d) a detector associated with a face of said beam splitter cube adjacent said source and on the opposite side of the beam splitting surface from said source comprising a detector arm, an objective lens associated with said test arm, or both.

2. The point source module of Claim 1 wherein said optical element comprises a plano-convex lens, said convex portion of said lens comprising said spherical reference surface.

3. The point source module of Claim 2 wherein said plano-convex lens comprises a partially light absorbing material.

4. The point source module of Claim 2 wherein said spherical reference surface has a reflective coating.

5. The point source module of Claim 1 further including a moveable lens for an interference mode of operation, said moveable lens situated between said beam splitter cube and said detector.

6. The point source module of Claim 1 further including a phase shifter situated between said beam splitter cube and said sample.

7. The point source module of Claim 6 wherein said phase shifter comprises two prisms.

8. The point source module of Claim 7 wherein said two prisms are arranged such that an optical axis of said objective lens is not substantially displaced laterally from an optical axis of said spherical reference surface, and phase shifting is achieved by lateral translation of one prism relative to the other prism.

9. The point source module of Claim 8 wherein at least one surface of at least one prism is provided with an antireflection coating to permit use of prisms having a surface normal to incident optical radiation.

10. The point source module of Claim 8 wherein said two prisms are spaced apart by a minimum distance so as to minimize displacement of said optical axes.

11. The point source module of Claim 7 further including (1) a mechanism for rotating said phase shifting prisms so that no planar surface is normal to incident optical radiation and (2) a mechanism to offset said objective lens axis to match an offset introduced by rotating said prism.

12. The point source module of Claim 6 further including a collimating lens between said beam splitter cube and said phase shifter.

13. The point source module of Claim 1 further including astigmatism in said objective lens so that an image from a test sample formed on said detector is indicative of direction of focus shift.

14. The point source module of Claim 1 wherein said detector is selected from the group consisting of a human eye associated with an eyepiece or an electronic camera with or without additional associated optics.

15. The point source module of Claim 1 wherein a filter is placed between said beam splitter cube and said spherical reference surface.

16. The point source module of Claim 1 wherein said optical element comprises a concave spherical mirror, said concave portion of said mirror comprising said spherical reference surface.

17. The point source module of Claim 16 further including a mechanism for phase-shifting said concave surface.

18. The point source module of Claim 17 wherein said mechanism for phase-shifting said concave surface employs either an axial or approximate axial translation of said concave surface.

19. The point source module of Claim 1 further including either a collimating auxiliary lens to produce a collimated output of optical radiation or an auxiliary lens as part of said objective lens in said test arm to change the working distance, numerical aperture, or both of said point source microscope.

20. A method of aligning a point source module, said point source module comprising: